

**Melissa A. Petruska**

MS-J585, C-PCS, Los Alamos National Laboratory, Los Alamos, NM 87545  
505-665-1746; [petruska@lanl.gov](mailto:petruska@lanl.gov)

**Education:**

**University of Florida**, Gainesville, FL 32611

Doctor of Philosophy, Chemistry, June 2000; GPA: 4.0/4.0

Doctoral Thesis Advisor: Daniel R. Talham

Dissertation Title: Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates

**Carnegie Mellon University**, Pittsburgh, PA 15213

Bachelor of Science, Chemistry, May 1995; GPA: 4.0/4.0

Undergraduate Research Advisor: Richard D. McCullough

**Experience:**

**Los Alamos National Laboratory**, Director-funded Postdoctoral Fellow (April 2001-present)

Synthesis of nanocrystal quantum dots (NQDs) and NQD assemblies for optical studies and applications

**BASF Corporation**, Beaumont, TX 77706; Chemist (July 2000-March 2001)

Research and development of economically viable routes to costly raw materials (including transition metal-catalyzed syntheses)

**University of Florida**, Research Assistant (May 1995-July 2000)

Preparation and characterization of hybrid organic/inorganic solid-state materials and Langmuir-Blodgett films with interesting magnetic and electronic properties

**University of Florida**, Teaching Assistant (August 1995-May 1996)

Teaching assistant for organic chemistry laboratory

**Carnegie Mellon University**, Undergraduate Research Assistant (January 1993-May 1995)

Synthesis and characterization of unsymmetrical tetrathiafulvalene (TTF) derivatives as precursors to metallic TTF and high spin molecules

**Honors:**

Los Alamos Achievement Award (2002)

Los Alamos National Laboratory Director-funded Postdoctoral Fellowship (2001-present)

Materials Research Society (MRS) Poster Award Winner (1999)

University of Florida Catalysis Conference Award for research in inorganic chemistry (1998)

National Science Foundation predoctoral fellowship (1995-1998)

**Publications:**

M. A. Petruska, A. V. Malko, P. M. Voyles, and V. I. Klimov "High-Performance, Quantum Dot Nanocomposites for Nonlinear-Optical and Optical-Gain Applications" *Adv. Mater.* accepted for publication.

A. V. Malko, A. A. Mikhailovsky, M. A. Petruska, J. A. Hollingsworth, H. Htoon, M. G. Bawendi, and V. I. Klimov "From Amplified Spontaneous Emission to Microring Lasing Using Nanocrystal Quantum Dot Solids" *Appl. Phys. Lett.* **2002**, *81*, 1303-1305.

M. A. Petruska, B. H. Watson, M. W. Meisel, and D. R. Talham "A Magnetic Manganese Phosphonate Film Containing a Tetrathiafulvalene Amphiphile" *Mol. Cryst. Liq. Cryst.* **2002**, *376*, 121-126.

M. A. Petruska, B. H. Watson, M. W. Meisel, and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates 5: A Magnetic Manganese Phosphonate Film Including a Tetrathiafulvalene Amphiphile" *Chem. Mater.* **2002**, *14*, 2011-2019.

- B. C. Watson, V. N. Kotov, M. W. Meisel, D. W. Hall, G. E. Granroth, W. T. Montfrooij, S. E. Nagler, D. A. Jensen, R. Backov, M. A. Petruska, G. E. Fanucci, and D. R. Talham "Magnetic Spin Ladder ( $C_5H_{12}N)_2CuBr_4$ : High-Field Magnetization and Scaling near Quantum Criticality" *Phys. Rev. Lett.* **2001**, *86*, 5168-5171.
- S. Molas, P. Batail, A. Figueras, M. A. Petruska, J. Santiso, D. R. Talham, and J. Fraxedas "Orientation-Controlled Growth of Molecular Organic Thin Films" *J. Mater. Chem.* **2000**, *10*, 2662-2665.
- M. A. Petruska and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates 4: Thermal Stability" *Langmuir* **2000**, *16*, 5123-5129.
- R. D. McCullough, M. A. Petruska, and J. A. Belot "Investigating the Synthesis of Unsymmetrical Tetrathiafulvalene Derivatives: Improved Yields by the Hidden Equivalent Method" *Tetrahedron* **1999**, *55*, 9979-998.
- G. E. Fanucci, M. A. Petruska, M. W. Meisel, and D. R. Talham "Structural Characterization and Magnetic Order in Phenoxy-Substituted Divalent Metal Phosphonate Langmuir-Blodgett Films" *J. Solid State Chem.* **1999**, *145*, 443-451.
- G. E. Fanucci, C. M. Nixon, M. A. Petruska, C. T. Seip, D. R. Talham, G. E. Granroth, and M. W. Meisel "Metal Phosphonate Langmuir-Blodgett Films: Magnetic Monolayers and Organic/Inorganic Dual Network Assemblies." *Supramolecular Chemistry of Synthetic Metallic Materials*, NATO ASI Series, **1998**.
- D. R. Talham, G. E. Fanucci, M. A. Petruska, and C. T. Seip "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates." *Mater. Res. Soc. Symposium Ser.* **1998**, *488*, 461-467.
- G. E. Fanucci, C. T. Seip, M. A. Petruska, S. Ravaine, C. M. Nixon, and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Known Layered Solids: Divalent and Trivalent Metal Phosphonates." *Thin Solid Films* **1998**, *327-329*, 331-335.
- M. A. Petruska and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates 3: An Azobenzene-Derivatized Phosphonic Acid Forms Continuous Lattice Layers with Divalent, Trivalent, and Tetravalent Metal Ions." *Chem. Mater.* **1998**, *10*, 3672-3682.
- M. A. Petruska, G. E. Fanucci, and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates 2: Zirconium Phosphonate-Based Alternating Layer Films." *Thin Solid Films* **1998**, *327-329*, 131-135.
- M. A. Petruska, G. E. Fanucci, and D. R. Talham "Organic/Inorganic Langmuir-Blodgett Films Based on Metal Phosphonates: Preparation and Characterization of Phenoxy- and Biphenoxy-Substituted Zirconium Phosphonate Films." *Chem. Mater.* **1998**, *10*, 177-189.
- D. R. Talham, C. T. Seip, S. Whippes, G. E. Fanucci, M. A. Petruska, and H. Byrd "Incorporating Inorganic Extended Lattice Structures into Langmuir-Blodgett Films: Comparing Metal Phosphonate LB Films to their Solid-State Analogs." *Comments Inorg. Chem.* **1997**, *19*, 133-151.
- Contributed Papers (Selected):**
- "Fabrication of Nanocrystal Quantum Dot-Based Titania Composites and their Nonlinear Optical and Lasing Properties," oral presentation at the Materials Research Society (MRS) Meeting, Boston, MA 2002.
- "Metal Phosphonate Langmuir-Blodgett Films Containing Functional Organic Groups," poster presentation at the Materials Research Society (MRS), San Francisco, CA 1999.
- "Metal Phosphonate Langmuir-Blodgett Films Containing Functional Organic Groups," oral presentation at the Florida ACS Meeting (FLAACS), Orlando, FL 1998.

**References:**

Dr. Victor Klimov, Chemistry Division, Physical Chemistry and Spectroscopy, Los Alamos National Laboratory, Los Alamos, NM 87545; 505-665-8284; [klimov@lanl.gov](mailto:klimov@lanl.gov)

Professor Daniel R. Talham, Department of Chemistry, University of Florida, Gainesville, FL 32611-7200; 352-392-9016; [talham@chem.ufl.edu](mailto:talham@chem.ufl.edu)

Professor Richard D. McCullough, Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA 15213; 412-268-3136; [rm5g@andrew.cmu.edu](mailto:rm5g@andrew.cmu.edu)

Professor Mark W. Meisel, Department of Physics, University of Florida, Gainesville, FL 32611-7200; 352-392-8867; [meisel@phys.ufl.edu](mailto:meisel@phys.ufl.edu)